

### AMENDMENTS TO THE CLAIMS

Please amend Claims as filed under PCT Article 34 as follows:

1. (Currently amended) ~~Process~~ A process for obtaining a composite material comprising at least one polymer matrix obtained by polymerization of a monomer referred to as a "monomer of interest" into a polymer, referred to as a "polymer of interest", in the presence of carbon nanotubes homogeneously dispersed in said polymer matrix, said process comprising ~~being characterized in that:~~

- using said carbon nanotubes ~~are used~~ as catalysis support to bind homogeneously at the surface thereof a cocatalyst/catalyst couple so as to form a catalytic system;
- activating said catalytic system ~~is rendered active~~ for polymerization;
- polymerizing ~~polymerization of~~ said monomer ~~is performed~~ at the surface of the carbon nanotubes using said active catalytic system, the polymerization being allowed to progress over time so as thus to obtain said polymer matrix around said carbon nanotubes, as the polymerization of said monomer proceeds.

2. (Currently amended) ~~Process~~ The process according to Claim 1, ~~characterized in that it comprises~~ further comprising the following steps:

- preparing a suspension of carbon nanotubes in an inert solvent;
- pretreating said carbon nanotubes by adding said cocatalyst, so as to obtain a suspension of pretreated carbon nanotubes in which the cocatalyst is adsorbed onto the surface of the carbon nanotubes;
- preparing a reaction mixture from the suspension of carbon nanotubes thus pretreated, by adding the catalyst and circulating a flow of monomer in said suspension of pretreated nanotubes, so as to bring about in said reaction mixture the polymerization of said monomer at the surface of said nanotubes and thus to form the composite material, in which said carbon nanotubes are coated with said polymer of interest;
- stopping the polymerization reaction when the polymerization in the reaction mixture has reached a rate of polymerization of between about 0.1% and about 99.9%.

3. (Currently amended) ~~Process~~ The process according to Claim 1 ~~or 2~~, ~~characterized in that~~ wherein said monomer is an olefin and said polymer of interest is a polyolefin.

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4. **(Currently amended) Process** The process according to Claim 1 ~~or 2~~, ~~characterized in that~~ wherein said monomer of interest is selected from the group consisting of ethylene, propylene, copolymers thereof with alpha-olefins, conjugated alpha-diolefins, styrene, cycloalkenes, norbornene, norbornadiene, ~~and~~ cyclopentadiene, and mixtures thereof.

5. **(Currently amended) Process** The process according to Claim 3, ~~characterized in that~~ wherein said polymer of interest is polyethylene.

6. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims~~, ~~characterized in that~~ wherein the cocatalyst/catalyst couple and the experimental parameters are chosen in such a way that the catalyst can be immobilized at the surface of the carbon nanotubes by means of the cocatalyst in order to thus form the catalytic system.

7. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims~~, ~~characterized in that~~ wherein the catalyst is capable of catalysing the polymerization of the monomer of interest and is selected from the group consisting of metallocenes, hindered amidoaryl chelates, hindered oxoaryl chelates, Fe (II and III) and Co (II) bis(imino)pyridines, and Brookhart complexes based on Ni (II), ~~and~~ Pd (II), and mixtures thereof.

8. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims~~, ~~characterized in that~~ wherein the cocatalyst is methylaluminumoxane or a chemically modified methylaluminumoxane, or a mixture thereof.

9. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims~~, ~~characterized in that~~ wherein the cocatalyst/catalyst catalytic couple is the methylaluminumoxane/Cp\*<sub>2</sub>ZrCl<sub>2</sub> couple.

10. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims~~, ~~characterized in that~~ wherein the amount of catalyst is between about 10<sup>-6</sup> and about 10<sup>-5</sup> mol/g of carbon nanotubes.

11. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims~~, ~~characterized in that~~ wherein the amount of cocatalyst in the reaction mixture is between about 10<sup>-3</sup> and about 10<sup>-2</sup> mol/g of carbon nanotubes.

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12. (Currently amended) ~~Process~~ The process according to Claim 2 ~~any one of the preceding claims, characterized in that~~ wherein the temperature of the reaction mixture is between 25° and 140°C.

13. (Currently amended) ~~Process~~ The process according to Claim 2 ~~any one of the preceding claims, characterized in that~~ wherein the pretreatment is performed at a temperature of between 25°C and 200°C for a time period of between 1 minute and 2 hours.

14. (Currently amended) ~~Process~~ The process according to Claim 1 ~~any one of the preceding claims, characterized in that~~ wherein the polymerization is performed at a pressure of between about 1 and about 3 bars of monomer.

15. (Currently amended) ~~Process~~ The process according to Claim 1 ~~any one of the preceding claims, characterized in that~~ wherein the polymerization is performed at a pressure of between about 1.1 and about 2.7 bars of monomer.

16. (Currently amended) ~~Process~~ The process according to Claim 2 ~~any one of the preceding claims, characterized in that~~ wherein, in order to prepare the reaction mixture, the catalyst is added to the suspension of pretreated carbon nanotubes before circulating the flow of monomer in said suspension.

17. (Currently amended) ~~Process~~ The process according to Claim 2 ~~any one of Claims 1 to 16, characterized in that~~ wherein, in order to prepare the reaction mixture, the addition of the catalyst to the suspension of pretreated carbon nanotubes and the circulation of the flow of monomer in said suspension are concomitant.

18. (Currently amended) ~~Process~~ The process according to Claim 1 ~~any one of the preceding claims, characterized in that~~ wherein the carbon nanotubes are selected from the group consisting of single-walled carbon nanotubes, double-walled carbon nanotubes and multi-walled carbon nanotubes, and/or mixtures thereof.

19. (Currently amended) ~~Process~~ The process according to Claim 1 ~~any one of the preceding claims, characterized in that~~ wherein the carbon nanotubes are crude and/or purified carbon nanotubes.

20. (Currently amended) ~~Process~~ The process according to Claim 1 ~~any one of the preceding claims, characterized in that~~ wherein the carbon nanotubes are functionalized carbon nanotubes.

21. **(Currently amended) Process** The process according to Claim 2 ~~any one of the preceding claims, characterized in that wherein~~ the polymerization reaction is stopped when the rate of polymerization is such that the composite comprises between about 50% and about 99.9% of carbon nanotubes and between about 50% and 0.1% of polymer.

22. **(Currently amended) Process** The process according to Claim 2 ~~any one of the preceding claims, characterized in that wherein~~ the polymerization reaction is stopped when the nanocomposite formed comprises between about 0.1% and about 50% of carbon nanotubes homogeneously dispersed at the nanoscopic scale in the polymer matrix, and between about 99.9% and 50% of polymer.

23. **(Currently amended) Process** The process according to Claim 1 ~~any one of the preceding claims, characterized in that it comprises~~ further comprising an additional step during which the composite material is used as a masterbatch to prepare a nanocomposite based on a polymer known as an "addition polymer", said addition polymer being miscible and compatible with the polymer of interest of the composite material.

24. **(Currently amended) Catalytic** A catalytic system for performing the process according to Claim 1 ~~any one of the preceding claims~~, consisting of carbon nanotubes, a cocatalyst and a catalyst, said catalyst forming with said cocatalyst a catalytic couple, in which said catalyst and said cocatalyst are bound to the surface of said carbon nanotubes.

25. **(Currently amended) Composition** A composition for performing the process according to Claim 1 ~~any one of the preceding claims~~ and comprising ~~the~~ a catalytic system ~~according to Claim 24~~, the catalyst being selected from the group consisting of metallocenes, hindered amidoaryl chelates, hindered oxoaryl chelates, Fe (II and III) and Co (II) bis(imino)pyridines, Brookhart complexes based on Ni (II) and Pd(II), and mixtures thereof, and the cocatalyst being methylaluminoxane or a chemically modified methylaluminoxane, or a mixture thereof.

26. **(Currently amended) Composite** A composite material obtained by the process according to Claim 1 ~~any one of the preceding claims~~.

27. **(Currently amended) Composite** The composite material according to Claim ~~any one of Claims 1 to 26~~, comprising between about 0.1% and 99.9% of carbon nanotubes and between about 99.9% and 0.1% of polymer.

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28. **(Currently amended) Composite** The composite material obtained by the process according to Claim 1 ~~any one of the preceding claims~~ and corresponding to a nanocomposite comprising at least one matrix of at least one polymer, in which carbon nanotubes are homogeneously dispersed at the nanoscopic scale.

29. **(Currently amended) Composite** The composite material according to Claim 28, comprising between about 0.1% and about 50% of carbon nanotubes and between about 99.9% and about 50% of polymer.

30. **(Currently amended) Composite** The composite material according to Claim ~~any one of Claims 26 to 29~~, wherein the carbon nanotubes are coated with polymer.

31. **(Currently amended) Composite** A composite material comprising a matrix of at least one addition polymer and the composite material according to Claim ~~any one of Claims 26 to 30~~.

32. **(Cancelled)**

33. **(Currently amended) Process** A process for polymerizing a monomer, ~~characterized in that it uses~~ comprising using the process according to Claim 1 ~~any one of the preceding claims~~, the polymerization reaction being allowed to proceed for a period sufficiently long so as to have a content of carbon nanotubes of less than 0.1% and a polymer content of greater than 99.9%.

34. **(Currently amended) Polymer** A polymer obtained by the process according to Claim 33.

35. **(New)** A catalytic system for performing the process according to Claim 23, consisting of carbon nanotubes, a cocatalyst and a catalyst, said catalyst forming with said cocatalyst a catalytic couple, in which said catalyst and said cocatalyst are bound to the surface of said carbon nanotubes.

36. **(New)** A composition for performing the process according to Claim 23 and comprising the catalytic system according to Claim 35, the catalyst being selected from the group consisting of metallocenes, hindered amidoaryl chelates, hindered oxoaryl chelates, Fe (II and III) and Co (II) bis(imino)pyridines, Brookhart complexes based on Ni (II) and Pd (II), and mixtures thereof, and the cocatalyst being methylaluminoxane or a chemically modified methylaluminoxane, or a mixture thereof.

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37. (New) A composite material obtained by the process according to claim 23.
38. (New) The composite material according to claim 37, comprising between about 0.1% and 99.9% of carbon nanotubes and between about 99.9% and 0.1% of polymer.
39. (New) The composite material obtained by the process according to Claim 23 and corresponding to a nanocomposite comprising at least one matrix of at least one polymer, in which carbon nanotubes are homogeneously dispersed at the nanoscopic scale.
40. (New) The composite material according to Claim 39, comprising between about 0.1% and about 50% of carbon nanotubes and between about 99.9% and about 50% of polymer.
41. (New) The composite material according to Claim 37, wherein the carbon nanotubes are coated with polymer.
42. (New) A composite material comprising a matrix of at least one addition polymer and the composite material according to Claim 37.
44. (New) A process for polymerizing a monomer, comprising using the process according to Claim 23, the polymerization reaction being allowed to proceed for a period sufficiently long so as to have a content of carbon nanotubes of less than 0.1% and a polymer content of greater than 99.9%.
45. (New) A polymer obtained by the process according to Claim 44.